

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
25 August 2005 (25.08.2005)

PCT

(10) International Publication Number
WO 2005/078801 A1

(51) International Patent Classification⁷: **H01L 27/146**,
G01J 3/46

Floravale, Westwood Avenue, #012-41, Singapore 648363
(SG).

(21) International Application Number:
PCT/SG2005/000043

(74) Agent: **ALBAN TAY MAHTANI & DE SILVA**; 39
Robinson Road, #07-01 Robinson Point, Singapore
069811 (SG).

(22) International Filing Date: 17 February 2005 (17.02.2005)

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,
ZW.

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/544,496 17 February 2004 (17.02.2004) US

(71) Applicant (for all designated States except US):
NANYANG TECHNOLOGICAL UNIVERSITY
[SG/SG]; 50 Nanyang Avenue, Singapore 639798 (SG).

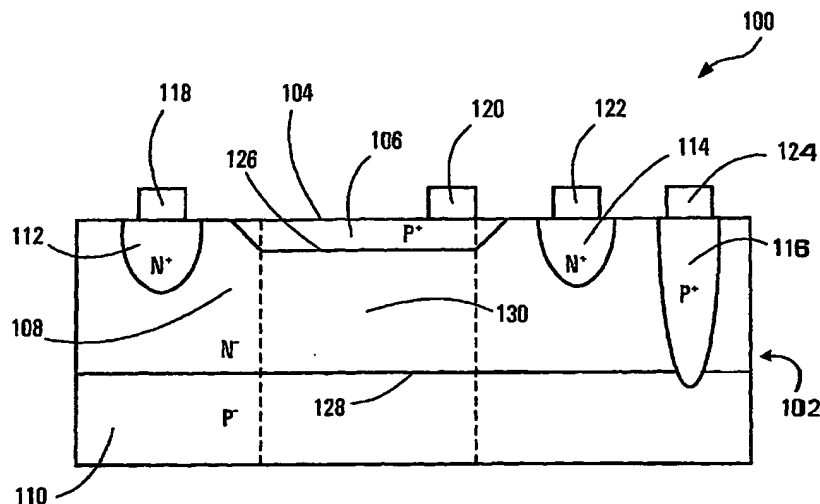
(72) Inventors; and

(75) Inventors/Applicants (for US only): **POENAR, Daniel**
Pulu [RO/SG]; 98 Nanyang Crescent, #06-03, Singapore
637665 (SG). **CARP, Mihaela** [RO/SG]; Blk 238 The

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO,

[Continued on next page]

(54) Title: METHOD AND DEVICE FOR WAVELENGTH-SENSITIVE PHOTO-SENSING



(57) Abstract: A semiconductor device includes a conducting channel (130) formed beneath a substrate surface with a pre-determined photo-conductivity spectral response. The channel is formed between two pn-junctions (126, 128) defining first and third photo-electric depletion regions at respective depths relative to the surface corresponding to penetration depths of light of different wavelengths. The first region (106) which has the light absorbing surface (104) above the first pn-junction (126) is specific to a first colour. The channel region (130) between the two pn-junctions (126, 128) is photo-conductive to a second colour. The third region below the second pn-junction (128) is sensitive to a third colour. Electrical contacts (118, 120, 122, 124) are disposed on the source (112), the top gate (106), the drain (114) and the bottom gate (116) for receiving the electrical currents induced by the presence of the absorbed wavelengths.

WO 2005/078801 A1



SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

Declaration under Rule 4.17:

— of inventorship (Rule 4.17(iv)) for US only

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.